FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT

U.S. Department of Energy
Golden Field Office

Enhanced Geothermal Systems Research, Development, and Demonstration

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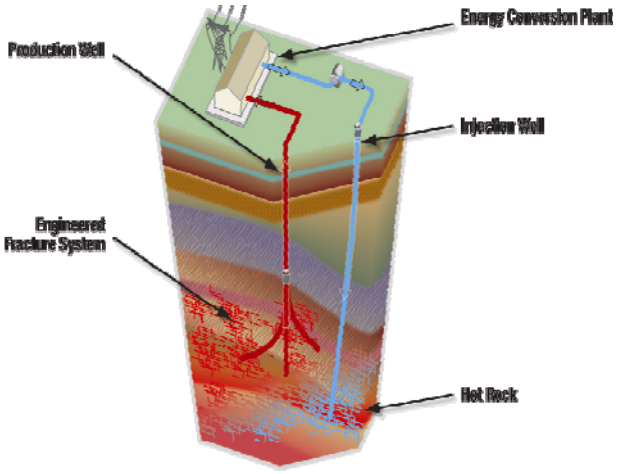
PART I – FUNDING OPPORTUNITY DESCRIPTION

Geothermal energy is an abundant, reliable, ubiquitous, base load, indigenous renewable energy source. Only the hydrothermal portion of the geothermal resource has been developed commercially around the world. However, there are a significant number of hydrothermal systems that do not have adequate productivity for economic production. The other resource categories have not reached commercial maturity and are less accessible through conventional hydrothermal technology.

The DOE-sponsored study, "The Future of Geothermal Energy[1]," led by the Massachusetts Institute of Technology (MIT), examined the potential of geothermal energy to meet the future energy needs of the United States. The study concluded that geothermal energy could provide 100,000 MWe in 50 years by using advanced technology known as Enhanced Geothermal Systems (EGS). EGS are fractured, hot-rock reservoirs that have been engineered to extract heat by the circulation of water between injection and production wells. Assumptions by the MIT study about the ability to create EGS reservoirs of sufficient volume, surface area, permeability and inter-well connectivity for commercial applications are reasonable given the current state of knowledge. However, these assumptions have not been corroborated by large, well-documented field projects in a number of different geological settings.



DOE used the MIT report as a starting point to identify and prioritize the technology improvements required to commercialize EGS. The results of this process are detailed in a DOE report entitled "An Evaluation of Enhanced Geothermal Systems Technology[2]."

The objective of this two-topic Funding Opportunity Announcement (FOA) is to solve critical Research & Development (R&D) needs for EGS technical feasibility and to increase the knowledge and understanding necessary for EGS to advance to a state of commercial readiness. Brief descriptions of both Topic Areas are as follows:

Topic Area 1: Component Technologies R&D

The R&D projects funded under this Topic Area will meet the critical R&D needs identified in the DOE EGS Technology Evaluation Report. DOE seeks projects that address key aspects of engineered reservoir creation, management, and utilization by developing tools and techniques useful to temperatures up to 300°C and depths as great as 10,000 m.

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[1] The MIT study is available at http://www1.eere.energy.gov/geothermal/future_geothermal.html.

[2] The technology evaluation report is available at http://www1.eere.energy.gov/geothermal/pdfs/evaluation_egs_tech_2008.pdf.

Topic Area 2: System Demonstrations

The projects funded under this Topic Area will characterize a geothermal system with low natural productivity, develop a plan to stimulate the productivity of the system, stimulate a well in the system and monitor the productivity or injectivity of the well in relation to other wells available in the system. The projects will allow testing and validation of stimulation techniques for improving productivity of wells or increasing inter-well connectivity at existing geothermal fields. Use of available or experimental technologies from geothermal, petroleum or other relevant industries will be considered.

Authorization for this FOA is provided under the Energy Independence and Security Act of 2007, Subtitle B - Geothermal Energy.

DOE conducted a meeting in Houston, TX on April 25, 2008 in order to gain input from interested stakeholders on the details of this announcement. Results of that meeting are incorporated in this FOA and also available at the following link: http://www1.eere.energy.gov/geothermal/.

A single Principal Investigator (PI) or organization may submit separate applications to multiple Topic Areas. However, a single PI or organization may not submit a single application that addresses multiple Topic Areas. Therefore, Applicants will be required to declare which Topic Area they are applying for within each application. Since linking of applications among the Topic Areas is not allowed, a clear declaration by the Applicant is essential.

Full descriptions of both Topic Areas are contained in Part II of this FOA. Award, eligibility, application submission, application review, and administrative information may be found in Parts III through IX of this FOA, and is applicable to both Topic Areas. Similarly, the Appendices are applicable to both Topic Areas.

A table summarizing key information specific to each Topic Area is listed below:

Topic Area Summary

Topic Area	Total Estimated Federal Funding*	Estimated FY08 Federal Funding	Anticipated Award Type	Expected Number of Awards	Anticipated Award Size	Award Ceiling / Floor	Period of Performance
1 - Component Technologies R&D	$40 million	$2.5 million	Cooperative Agreements or Grants	5-20	$750,000 - $1 million	$5 million / None	2 - 5 years
2 - System Demonstrations	$50 million	$8 million	Cooperative Agreements	2-6	$15 million	$15 million / None	Up to 3 years with long-term data collection

*** Funding is available at $10.5 million for FY08. Subject to Congressional appropriations, up to an additional $30 million is expected to be available for awards in FY09. Additional funding up to $49.5 million is expected to be available in FY10, subject to change and Congressional appropriations.**

PART II – TOPIC AREA DESCRIPTIONS

Note: Full descriptions of both Topic Areas are contained in Part II of this Funding Opportunity Announcement.

TOPIC AREA 1 (COMPONENT TECHNOLOGIES RESEARCH & DEVELOPMENT) DESCRIPTION

A. BACKGROUND

DOE is seeking advanced technology to address key aspects of engineered reservoir creation, management, and utilization. Projects are sought to develop technology for cost-effective creation, management, and utilization of EGS in high temperature environments. The objective is to develop tools and techniques that are useful at temperatures as high as 300°C and depths as great as 10,000 meters. GTP understands that research and development conducted under these projects may only be able to advance existing technology incrementally. **Therefore, projects will be evaluated based on their ability to advance technology toward the ultimate target specifications listed below. The rapid development and commercialization of these new technologies will be needed to drive the market development of engineered geothermal systems.**

B. RESEARCH SUBTOPIC AREAS

Hydraulic stimulation of fractures is considered the primary means of creating functional geothermal reservoirs at sites where the permeability of the rock is too limited to allow heat recovery at economic rates. Supporting technological improvements are needed in:

1. Zonal isolation – isolate wellbore zones in high pressure and temperature environments in open (uncased) and cased holes using packers, expandable tubulars or other methods capable of providing zonal isolation

2. Downhole pumps – augment flow rates by using downhole pumps to add hydraulic head at depth

3. Fracture characterization – accurately detect and characterize rock mass fracture systems

4. Image fluid flow – accurately image fluid in created and/or pre-existing fractures so as to map flow through the reservoir

5. Tracers and tracer interpretation – adapt or develop reservoir tracers and/or tracer interpretation techniques that provide information beyond well-to-well connectivity such as fracture surface area or fracture spacing

6. High-temperature logging tools and sensors – downhole instruments to detect fractures and log or monitor temperature, pressure, flow rates, and seismic events in wellbores

7. Stimulation prediction models – accurately simulate a reservoir's response to a

stimulation

C. SUBTOPIC AREA TARGET SPECIFICATIONS

Target deliverables and definitions of 100% success in these seven subtopic areas are as follows:

1. Development of packers and associated tubular goods, valves, etc. capable of operating with differential pressures of 400 bar in wellbore diameters from 6 5/8" to 10 5/8", both drillable and/or retrievable. For drillable hardware, the device should have an indefinite operating period. For retrievable hardware, the intent is to operate for greater than 14 days.

2. Development of downhole pumps capable of being set at depths as great as 3 kilometers in wellbores with diameters of 6 5/8" to 10 5/8" including deviated wellbores, providing up to 300 bar added pressure at flow rates of up to 80 kg/s, and operating without workover for a performance period of three or more years.

3. Development of fracture characterization technology capable of resolution of rock mass fracture systems at depths between 1,000 and 10,000 meters using surface or wellbore sensors, in rocks of various types and compositions.

4. Development of fluid flow imaging technology capable of imaging reservoir fluid flow through created and/or pre-existing fractures at depths of 1,000 to 10,000 meters using surface or wellbore sensors, in rocks of various types and compositions.

5. Development of tracers and tracer interpretation techniques capable of being used at temperatures up to 300° C and providing information beyond well-to-well connectivity.

6. Development of tools and sensors for logging and monitoring wellbore conditions at depths of up to 10,000 meters and temperatures of up to 300° C.

7. Development of stimulation prediction models capable of accurately predicting the location, spacing, and orientation of created fractures.

All of the above are to be operational to depths of 10,000 meters and temperatures of 300° C.

TOPIC AREA 2 (SYSTEM DEMONSTRATIONS) DESCRIPTION

A. BACKGROUND

The long term objective of DOE is to create, sustain, replicate, and demonstrate EGS technologies. Successful creation of an EGS reservoir depends on the ability to engineer a commercially-productive reservoir. Once the reservoir is created, the biggest challenge is to establish inter-well connectivity at viable fluid flow and heat extraction rates. The goal is to increase the flow between wells that intercept the reservoir, or conversely decrease the flow "impedance" without short-circuiting and sustain the flow and heat extraction rates for sustained periods (years).

In order to achieve replicability, there exists a need to create and sustain EGS reservoirs in many different geological environments. Finally, technologies are needed that reduce the cost of electricity produced from such reservoir to levels competitive with other energy sources.

B. PROJECT DESCRIPTION

The objective of this Topic Area is to partner with industry, academia, and other stakeholders to validate the stimulation techniques for inter-well connectivity at existing geothermal fields using available technologies from geothermal, oil and gas, and other relevant sectors. This approach directly benefits hydrothermal field developers and successful stimulation techniques offer the ability to make a previously unproductive well commercially productive.

Awards made under this Topic Area will be cooperative agreements that will include well stimulation and data collection and analysis over three Phases. The projects funded under this Topic Area will add to the general EGS knowledge base and help accelerate technology improvements in order to fully commercialize unproductive or underproductive geothermal resources. Listed below are the major technical documents required for applications submitted in response to this Topic Area. Applicants should note that a number of other documents are also required as detailed in *Part V.C – Content and Form of Application.*

The DOE Geothermal Technologies Program will be substantially involved in agreements made under this Topic Area due to planned participation in site characterization, reservoir creation and management of the reservoir. Federally Funded Research and Development Centers (FFRDCs) and the USGS will be involved at various stages in the technical interpretation and analysis of ongoing awards. DOE will also utilize FFRDCs and other experts during the go/no-go decision process.

Proprietary information contained within the application documents **must** be clearly marked as detailed in *Part IX.D – Proprietary Application Information.* Applications should be structured as laid out by *Part V.C – Content and Form of Application.* Applicants **must** clearly address all of the Merit Review Criteria as listed in this section. Applicants should closely examine *Appendix B – Personally Identifiable Information (PII),* and **refrain from including PII** in the Project Summary / Abstract or the Project Narrative and attachments.

C. PROJECT REQUIREMENTS

Major Documentation Required

Applications **must** include all existing exploration data that led to the site becoming a stimulation opportunity candidate. This data will become an attachment to the Project Narrative. The proposed project should focus on improving the productivity or injectivity of existing wells that encounter insufficient permeability in reservoir rock. Candidate wells should have completed lithologies and have stress settings expected to be favorable for EGS development.

Applications **must** provide a geological map of the project area with topographic, geological features, roads, rivers, mountain ranges, well locations, fault locations, etc. and lease boundaries at a scale of at least 1:62,500. A stratigraphic/lithologic column for the proposed well including a temperature profile plotted against depth is required as part of the application. A baseline flow-rate of the candidate well **must** either be provided with the initial application or must be part of Phase I activities.

Applicants **must** include well-documented site characterizations and sound justifications as to why the candidate wells and sites are suitable for stimulation. Applicants are strongly advised to include temperature at target depth candidate well condition, evidence that the well is open to depth of interest, casing schedule, well completion history, and evidence of casing integrity. Applicants **must** include relevant site and regional geological data derived from geophysical logs, regional geological logs, surveys, cross sections, etc. A geological model that demonstrates an understanding of the specific rock mass properties, stress regime (if available), and a petrologic/mineralogic re-examination of cuttings/core to reveal attractive lithologic targets must be provided. Applicants **must** also include the results and data of all flow or injection tests.

Applicants **must** demonstrate right of access to the candidate site and wells including a map showing surface and subsurface rights of ownerships and leased boundaries. Compliance with relevant environmental laws and regulations must be provided.

Applications **must** include the National Environmental Policy Act (NEPA) EF1 as detailed in *Part V.C.h – Environmental Questionnaire*. Please also note that copies of all existing or historical permitting and regulatory actions related to the proposed project must also be submitted with EF1 documentation.

The application with the candidate site of higher temperature gradient and with existing infrastructure as well as Applicants who exhibit willingness to collect data and contribute to the EGS knowledge base will be given greater consideration.

Applicants who propose to include students from accredited academic institutions in various capacities during the course of the field projects will be given greater consideration.

Applicants should also include a plan to address potential risks and liabilities that are associated with the field stimulation project in their application.

Applicants should clearly differentiate between the Objectives below in both the project narrative discussion and the budget documents. The project should be clearly organized

into three phases as described below.

Phase I – Pre-Stimulation

Phase I may include data collection conducted by DOE supported researchers. Regulatory and environmental requirements for project performance must be completed in this phase. Flow and/or injection testing of the well shall also be conducted to assist in planning for the stimulation. The stimulation shall be planned using commercially available stimulation methods and technologies.

Phase I will consist of three Objectives:

Objective 1: Development of Stimulation Plan

The minimum requirement for Objective 1 is to create a complete geologic model in support of a plan for well stimulation; and develop a concise stimulation plan. Characterizing the well includes collection of all geologic and engineering data needed to plan a successful stimulation of the candidate well. Creation of the stimulation model may include (but is not limited to) the following: petrologic/petrographic analysis, rock mechanics tests, magneto-telluric (MT) studies, geochemistry analysis, background seismology/microseismic analysis, borehole imaging/logging, fracture analysis, existing flow and/or injection tests, and fracture stimulation modeling. This Objective also includes deploying a micro-seismic network and conducting a mini-frac of the targeted interval to assist in designing a stimulation plan. Data on in-situ stress and natural fracture distributions shall be developed from borehole testing and logging. (A high-temperature borehole televiewer will be available on loan from Sandia National Laboratories.)

Objective 2: *Planning and Permitting*

The minimum requirement for Objective 2 is to secure necessary permits and approvals, performing necessary site, archaeological and other surveys, and maintaining compliance with all environmental, health, safety, NEPA and legal restrictions. Applicants should note that all permits and regulatory approvals relating to the base site, specific well, and/or proposed work must be submitted to DOE.

Applicants should note that this Topic Area is focused on demonstrating EGS with supporting data collection and analysis; therefore, proposed projects that have begun the permitting and geologic modeling process will be rated higher. Likewise, it is also stressed that proposed projects that have already completed most of the regulatory and permitting steps prior to the application submission are more likely to be selected for award.

Objective 3: Reporting and Publications

The minimum technical requirement for Phase I is to obtain sufficient information and permission to stimulate the well in Phase II. This information shall be documented in a Phase I report.

The Phase I report **must** include the items listed below. If any of these items were included in the initial application, an updated version must be included as part of the Phase I report.

- Geologic model (including geophysical, geological, geochemical, and

geomechanical data and analytical/numerical results);
- Natural fracture system/prediction stress field analysis, creation, and control of fracture growth pattern;
- Productivity or injectivity of the candidate well. Results of all flow or injection tests of the well and productivities of neighboring wells. (The data on neighboring wells may be provided in a separate document which may be labeled "Proprietary";
- Pre-stimulation power potential (MWe) of the candidate well;
- Logs run in the candidate well (pressure temperature spinner (PTS), sonic, natural gamma, tool-head temperature, etc.);
- Borehole imaging logs of the candidate well (e.g., televiewer, formation micro-scanner (FMS), other) for both pre- and post-stimulation;
- Estimated volume of rock expected to be stimulated based on use of an accepted stimulation modeling package;
- A final compilation of the well stimulation plan (a key document);
- All reports, plans, permits, licenses, and other items required by governmental regulatory agencies for the performance of this work, including NEPA determination and documentation; and,
- Identification of the agency whose requirement the item fulfills, and the actual or projected submittal as well as agency approval dates. Note that any costs incurred for these activities prior to selection (see *Part III.G – Pre-award Costs*) will not be considered project costs, even though the effort served as a prerequisite for this Objective.

Phase II – Stimulation

Phase II should include necessary wellbore modification, redesign of micro-seismic network if needed to further understand seismicity during the stimulation, other monitoring techniques (such as tiltmeter), and finally execution of a full well stimulation. **If wellbore modification is needed to complete Phase I activities, DOE reserves the right to include a Go/No-Go decision before implementation of Phase II activities.**

Phase II will consist of four Objectives:

Objective 1: Wellbore Readiness

The minimum requirement for Objective 1 is to complete the candidate well with minor wellbore modification activities so that it is ready for stimulation work. It is the intent of DOE to demonstrate EGS in the very near future; therefore applications should clearly discuss the level of work-over anticipated for the proposed well and prepare the budget documents accordingly.

Applicants should note that this Topic Area is focused on demonstrating EGS with supporting data collection and analysis; therefore, proposed projects that have the least amount of well work-over will be rated higher.

Objective 2: Stimulation

The minimum requirement for Objective 2 is to complete stimulation of the candidate geothermal well via hydraulic or other means to demonstrate the effectiveness of the stimulation by establishing inter-well connectivity. Work may include mobilization/demobilization of stimulation equipment, execution of well stimulation,

running geophysical or production logs, fluid sampling, monitoring of the stimulation through use of microseismicity, tiltmelters or other techniques, flow tests, tracer tests, etc.

Applicants must maintain compliance with all federal, state, and local environmental, health, safety, and legal restrictions.

Applicants must agree to collect data and monitor the stimulation well and other wells within the field, especially those affected by the stimulation for a minimum of two years.

Objective 3: Data Collection, first two years
For the first two years of data collection, DOE intends to be actively involved in the data collection process with the assistance of DOE National Laboratories. For example, personnel from Sandia National Laboratory will be involved in all activities surrounding the use of the televiewer for logging and data collection.
Data should include (at a minimum):

- Microseismic data and interpretation;
- Productivity or injectivity data and analysis;
- Logs run in the well (PTS, sonic, natural gamma, tool-head temperature, etc.);
- Borehole imaging logs (e.g., televiewer, FMS, other) for both pre- and post-stimulation;
- Well flow rates and well head temperatures;
- Chemistry of produced fluid and mineral dissolution/precipitation;
- Formation response/evolution data; and
- Tracer data, analysis and results of tracer tests if the well is in communication with other wells in the field or to determine such connection.

DOE may require more data if necessary, but will work with successful applicants prior to work commencing on Phase I to determine the final set of required data. DOE will determine the type, format, and frequency of data collected over all phases of the project. DOE will require the data to have a certain minimum accuracy and precision to optimize its utility for analysis. Data provided to DOE during all three phases of the projects will be kept at an EGS National Data Center without access restriction.

Objective 4: Reporting and Publications
DOE will specify the data to be collected immediately before, during, and after the Phase II stimulation. Applicants should be prepared to provide, at a minimum, the following:

- Microseismic data and interpretation;
- Productivity or injectivity data and analysis;
- Well flow rates and well head temperatures;
- Chemistry of produced fluid and mineral dissolution/precipitation;
- Formation response/evolution data; and
- Tracer data, analysis and results of tracer tests if the well is in communication with other wells in the field or to determine such connection.

The minimum technical requirement for Phase II is the successful stimulation of the well and preparation for subsequent Phase III monitoring, data collection and assessment

work. This information shall be documented in a Phase II report. Initial results of the stimulation shall be reported within two months of completion of the stimulation as a publicly available DOE report.

At a minimum, the Phase II report should include the following data sets:

- Daily stimulation reports;
- Stimulation data;
- Logs run in the well (PTS, sonic, natural gamma, tool-head temperature, etc.);
- Borehole imaging logs (e.g., televiewer, FMS, other) for both pre- and post-stimulation;
- Formation response data for both pre- and post-stimulation; and
- Pumping and related data to evaluate the stimulation.

Phase III – Long Term Data Collection and Monitoring

Phase III must include running a suite of logs necessary to characterize the near wellbore response of the targeted formation to stimulation in order to characterize the sustainability of the EGS reservoir.

The requirements for Phase III are to test the well and collect data over a number of years following well stimulation to assess long-term performance of the stimulated well and other wells affected by the stimulation. Phase III work must include tracer tests, geochemistry, and geochemical analysis for the candidate and associated wells.

Objective 1: Long Term Data Collection and Monitoring

For the final years of data collection, the applicant is expected to continue collecting well data for analysis. Applicants should expect this data to be consistent with the data required during the first two years; however, DOE reserves the right to require more or different data or frequency of data collection if necessary. In this case, DOE will work with successful applicants prior to work commencing on this Objective to determine the final set of required data.

Objective 2: Reporting and Publications

The minimum requirement of this Objective is to provide short and long tern flow test reports. At the end of Phase III, the recipient shall submit a final technical report that includes all Phases of the award.

D. REPORTING

Award recipients will be expected to submit or present the following reports, at a minimum:

- Quarterly Technical and Financial reports will be submitted quarterly;
- Annual Technical and Financial reports will be submitted annually;
- Phase I Report;
- Phase II Report;
    a. Preliminary Stimulation Report within two weeks of stimulation;
    b. Final Stimulation Report, for public dissemination, within two months of stimulation;

c. Reservoir Data Report after the first two years of data collection;

- Phase III Report;
- Final Report;
- Annual Operating Plan;
- Peer/Program Review Report; and
- Other reports as deemed necessary by the GTP Project Officer.

DOE must be provided with reasonable access to the project site. DOE will determine the type, format, and frequency of data collected over all phases of the project. DOE will require the data to have a certain minimum accuracy and precision to optimize its utility for analysis. Data provided to DOE during all three phases of the projects will be kept at an EGS National Data Center without access restriction.

Award recipients are required to submit a technical report at the conclusion of Phases I and II, as well as a final technical report at the completion of Phase III that will address all phases of the project. Award recipients that do not continue past the decision point at the end of Phase I or Phase II will submit their applicable Phase report in place of the final technical report.

PART III - AWARD INFORMATION

A. TYPE OF AWARD INSTRUMENT

For Topic Area 1 (Component Technologies R&D), DOE anticipates awarding grants or cooperative agreements.

For Topic Area 2 (System Demonstrations), DOE anticipates awarding cooperative agreements.

B. GO/NO-GO STRATEGY

The following go/no-go strategy applies to both Topic Areas:

For Topic Area 1 (Component Technologies R&D), each awarded project will undergo regular go/no-go reviews.

For Topic Area 2 (System Demonstrations), each awarded project will undergo a go/no-go review at the end of Phase I (Pre –Stimulation) and Phase II (Stimulation).

Factors under consideration for both Topic Areas are as follows:

- Project performance;
- DOE review of all reports submitted **(annual performance reports for Topic Area 1, Phase and the final Phase reports for Topic Area 2)**;
- Recommendations of DOE Federally Funded Research and Development Contractors (FFRDCs) and/or other outside experts recognized by DOE, as needed;
- Programmatic determination as to the current mission and goals of GTP; and
- The level of funding available to GTP for award continuation.

At the go/no-go decision point, DOE will make one of three decisions for each award:

- "Go" Forward – the project is on track, minimal or no modifications are required, work is acceptable, the proposed work plan for the next performance phase is acceptable, funding is available and the project continues to be appropriate to the mission and goals of the GTP.
- "Return" – the project is still viewed as having a high likelihood of success; however, additional information is required before a firm "Go" or "No-Go" decision can be made.
- "No-Go" – the project will either be put on hold or DOE will not provide further funding. This may be due to irresolvable technical difficulties, changes in the GTP mission, goals or portfolio or lack of appropriated funds. In the case of a "No-Go" decision the final annual report will be accepted by the GTP to fulfill the final technical report requirement.

C. ESTIMATED FUNDING

For Topic Area 1 (Component Technologies R&D), funding is available at $2.5 million

for FY08. Subject to Congressional appropriations, up to an additional $9 million is expected to be available for awards in FY09. Additional funding up to $28.5 million is expected to be available in FY10, subject to change and Congressional appropriations.

For Topic Area 2 (System Demonstrations), funding is available at $8 million for FY08. Subject to Congressional appropriations, up to an additional $17 million is expected to be available for awards in FY09. Additional funding up to $25 million is expected to be available in FY10, subject to change and Congressional appropriations.

D. MAXIMUM AND MINIMUM AWARD SIZE

Ceiling (i.e., the maximum amount for an individual award made under this Topic Area):

For Topic Area 1 (Component Technologies R&D), the award ceiling is $5 million.

For Topic Area 2 (System Demonstrations), the award ceiling is $15 million.

Floor (i.e., the minimum amount for an individual award made under this Topic Area):

For Topic Area 1 (Component Technologies R&D), there is no award floor.

For Topic Area 2 (System Demonstrations), there is no award floor.

E. EXPECTED NUMBER OF AWARDS

For Topic Area 1 (Component Technologies R&D), DOE anticipates making 5-20 awards.

For Topic Area 2 (System Demonstrations), DOE anticipates making 2-6 awards.

F. ANTICIPATED AWARD SIZE

For Topic Area 1 (Component Technologies R&D), DOE anticipates that awards will be in the $750,000 - $1 million range for the total project period.

For Topic Area 2 (System Demonstrations), DOE anticipates that awards will be in the $15 million range for the total project period.

G. PERIOD OF PERFORMANCE

For Topic Area 1 (Component Technologies R&D), DOE anticipates making awards that will run 2-5 years.

For Topic Area 2 (System Demonstrations), DOE anticipates making awards that will run for up to 3 years though the end of Phase II (Stimulation). DOE will work with successful applicants prior to work commencing on this Phase III (Long Term Data Collection and Monitoring) to determine period of time over which data will be collected long term. The majority of project funding will be expended in Phases I (Pre-Stimulation) and II (Stimulation).

H. TYPE OF APPLICATION

For both Topic Areas, only new applications will be accepted under this FOA (e.g., applications for renewals of existing DOE funded projects will not be considered).

PART IV - ELIGIBILITY INFORMATION

A. ELIGIBLE APPLICANTS

Institutions of higher education, non-profit and for-profit private entities, State/Local Governments, and Indian tribes are eligible to apply.

B. COST SHARING

For Topic Area 1 (Component Technologies R&D), the cost share must be at least 20% of the total allowable costs of the project (i.e., the sum of the Government share and the recipient share of allowable costs equals the total allowable costs of the project) and must come from non-Federal sources unless otherwise allowed by law.

For Topic Area 2 (System Demonstrations), recipient cost share requirements vary by both the Phase of the award and the activities within a particular phase and must come from non-Federal sources unless otherwise allowed by law. Applicants should clearly describe activities proposed for each Objective, listed below, and note the appropriate cost share level. All applicants are strongly encouraged to review Appendix C – Cost Sharing Information to ensure that the required recipient cost share is correctly calculated.

- **Phase I – Pre-Stimulation**
    - *Development of Stimulation Plan* – the recipient cost share must be at least 20% of the total project costs for all activities under this Objective.
    - *Planning and Permitting* – the recipient cost share must be at least 80% of the total project costs for all activities under this Objective.
    - *Reporting and Publications* – the recipient cost share for all reporting, publishing and technology transfer must be at least 50%. This cost share requirement includes all reporting requirements for Phase I.
- **Phase II - Stimulation**
    - *Wellbore Modification* – the recipient cost share must be at least 20% of the total project costs for all well wellbore modification and related activities.
    - *Stimulation* – the recipient cost share must be at least 20% of the total project costs for all stimulation and related activities.
    - *Data Collection, first two years* – the recipient cost share for the first two years of data collection and analysis must be at least 50%.
    - *Reporting and Publications* – the recipient cost share for all reporting, publishing and technology transfer must be at least 50%. This cost share requirement includes all reporting requirements for Phase II.
- **Phase III – Long Term Data Collection and Monitoring**
    - *Long Term Data Collection and Monitoring* – the recipient cost share for all long term data collection and monitoring must be at least 50% following successful stimulation of the well.

- *Reporting and Publications* – the recipient cost share for all reporting, publishing and technology transfer must be at least 50%. This cost share requirement includes all reporting requirements for Phase III.

C. MULTIPLE PRINCIPAL INVESTIGATORS

The assignment and use of multiple PI's in projects awarded under this FOA is allowed. The applicant, whether a single organization or team/partnership/consortium, must however indicate in the application if the project will include multiple PI's. The decision to use multiple PIs for a project is the sole responsibility of the applicant. If multiple PI's will be designated, the application must identify in the application the Contact PI/Project Coordinator and provide a "Coordination and Management Plan" that describes the organization structure of the project as it pertains to the designation of multiple PI's. This plan should, at a minimum, include:

- Process for making decisions on scientific/technical direction;
- Publications;
- Intellectual property issues;
- Communication plans;
- Procedures for resolving conflicts; and
- PI's roles and administrative, technical and scientific responsibilities for the project.

PART V – APPLICATION AND SUBMISSION INFORMATION

A. ADDRESS TO REQUEST APPLICATION PACKAGE

Application forms and instructions are available at Grants.gov. To access these materials, go to http://www.grants.gov, select "Apply for Grants," and then select "Download Application Package." Enter the CFDA and/or the funding opportunity number located on the cover of this announcement and then follow the prompts to download the application package. **(Also see Section H of this Part below.)**

B. LETTER OF INTENT AND PRE-APPLICATION

1. Letter of Intent

- Letters of Intent are not required.

2. Pre-application

- A pre-application is not required.

C. CONTENT AND FORM OF APPLICATION

You must complete the mandatory forms and any applicable optional forms, in accordance with the instructions on the forms and the additional instructions below, as required by this FOA. **Files that are attached to the forms must be in Adobe Portable Document Format (PDF) unless otherwise specified in this announcement**.

A single PI or organization may submit separate applications to multiple Topic Areas. However, a single PI or organization may not submit a single application that addresses multiple Topic Areas – i.e., applications to different Topic Areas must be submitted separately as they will be evaluated separately according to their respective merit review criteria. Therefore, applicants will be required to declare which Topic Area they are applying for within each application. Since linking of applications among the Topic Areas is not allowed, a clear declaration by the Applicant is essential.

The GTP anticipates providing separate funding directly to FFRDCs for monitoring, evaluation and assistance to FOA Awardees. Applicants who wish to make use of FFRDC capabilities should identify in their applications a detailed scope of technical assistance required from the FFRDCs. If you wish to partner with an FFRDC or wish to receive technical assistance from an FFRDC, please contact them directly. FFRDC capabilities can found at the GTP homepage: http://www1.eere.energy.gov/geothermal/egs_technology.html. All work proposed for DOE FFRDCs is subject to negotiation of award.

All questions regarding FFRDC participation, qualifications and resources must be submitted through the "Submit Question" feature of the DOE Industry Interactive Procurement System (IIPS) at http://e-center.doe.gov as described in Part VI, Section A of this announcement.

SF 424 - Application for Federal Assistance

Complete this form first to populate data in other forms. Complete all required fields in accordance with the pop-up instructions on the form. **To activate the instructions, turn on the "Help Mode" (Icon with the pointer and question mark at the top of the form.)** The list of certifications and assurances referenced in Field 21 can be found at http://management.energy.gov/business_doe/business_forms.htm, under Certifications and Assurances.

Other Attachments Form

Submit the following files with your application and attach them to the Other Attachments Form. Click on "Add Mandatory Other Attachment" to attach the Project Narrative. Click on "Add Optional Other Attachment," to attach the other files.

a. Project Summary/Abstract File

The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director/principal investigator(s), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (i.e., benefits, outcomes), and major participants (for collaborative projects). Applicants are cautioned that this document should not include any proprietary information, trade secrets, or other confidential business, financial or sensitive information, since this summary may be subject to public disclosure under the Freedom of Information Act (FOIA). The project summary must not exceed 1 page when printed using standard 8.5" by 11" paper with 1" margins (top, bottom, left and right) with font not smaller than 11 point. Save this information in a file named "Summary.pdf," and click on "Add Optional Other Attachment" to attach.

b. Project Narrative File - Mandatory Other Attachment

The project narrative must not exceed 20 pages (for each Topic Area). This includes the cover page, table of contents, charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right). EVALUATORS WILL REVIEW ONLY THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE. The font must not be smaller than 11 point. Do not include any Internet addresses (URLs) that provide information necessary to review the application. See Part VII.D for instructions on how to mark proprietary application information. Save the information in a single file named "Project.pdf," and click on "Add Mandatory Other Attachment" to attach.

The project narrative must include:

- Project Objectives.
  This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.

- Merit Review Criterion Discussion.
  The section should be formatted to address each of the merit review criterion and sub-criterion listed previously for each Topic Area in Part II. Provide sufficient information so that reviewers will be able to evaluate the application in accordance with these merit review criteria. DOE WILL EVALUATE AND CONSIDER ONLY THOSE APPLICATIONS THAT ADDRESS SEPARATELY EACH OF THE MERIT REVIEW CRITERION AND SUB-CRITERION.

The above listed components of your Project Narrative combined, must be within the Narrative page limit specified above. Documents listed below may be included as clearly marked appendices to your Narrative and will not count towards the Project Narrative page limit. Please note that some of the required documents listed below may have their own page limits to which you must adhere.

c. Resume File

Provide a resume for each key person proposed, including subawardees and consultants if they meet the definition of key person. A key person is any individual who contributes in a substantive, measurable way to the execution of the project. Save all resumes in a single file named "resume.pdf" and click on "Add Optional Other Attachment" to attach. Each resume must not exceed 2 pages when printed on 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right) with font not smaller than 11 point and should include the following information, if applicable:

Education and Training: Undergraduate, graduate and postdoctoral training; provide institution, major/area, degree and year.

Professional Experience: Beginning with the current position list, in chronological order, professional/academic positions with a brief description.

Publications: Provide a list of up to10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically.

Patents, copyrights and software systems developed may be provided in addition to or substituted for publications.

Synergistic Activities: List no more than 5 professional and scholarly activities related to the effort proposed.

The resume file does not have a page limitation.

d. Budget File

SF 424 A Excel, Budget Information – Non-Construction Programs File

You must provide a separate budget for each year of support requested and a cumulative budget for the total project period. Use the SF 424 A Excel, "Budget Information – Non Construction Programs" form on the Applicant and Recipient Page at http://management.energy.gov/business_doe/business_forms.htm. You may request funds under any of the Object Class Categories as long as the item and amount are necessary to perform the proposed work, meet all the criteria for allowability under the applicable Federal cost principles, and are not prohibited by the funding restrictions in this announcement (See PART III, G). Save the information in a single file named "SF424A.xls," and click on "Add Optional Other Attachment" to attach.

e. Budget Justification File

The Budget Justification must be presented by Phase. It is expected that the Budget Justification for Phase 1 will be completely detailed and supported. You must also include the Budget Justification for subsequent Phases as well as the estimated funding level required for each subsequent Phase including federal funding and cost share. The budget justification support may not be able to be supported with the same level of detail for the latter phases, and this is acceptable as adequately explained in the budget justification.

The format provided as PMC 123.1, Budget Justification for SF-424A, on the Applicant and Recipient Page at https://www.eere-pmc.energy.gov/forms.aspx is recommended but not required for use in providing this budget justification. Save the information in a single file named "BudgetJustification.pdf" and click on "Add Optional Other Attachment" to attach.

f. Letters of Commitment

You must have a letter from each third party contributing cost sharing (i.e., a party other than the organization submitting the application) that proposes to provide all or part of the required cost sharing. **All Letters of Commitment must be attached to the Project Narrative File.** The letter must state that the third party is committed to providing a specific minimum dollar amount of cost sharing. In the budget justification, identify the following information for each third party contributing cost sharing: (1) the name of the organization; (2) the proposed dollar amount to be provided; (3) the amount as a percentage of the total project cost; and (4) the proposed cost sharing – cash, services, or property. Letters of Commitment from parties participating in the project, exclusive of vendors, who will not be contributing cost share, but will be integral to the success of the project must be included as part of this Appendix to the Narrative. Letters of Commitment will not count towards the Project Narrative page limit.

g. Subaward Budget File(s) (if applicable)

You must provide a separate budget (i.e., budget for each budget year and a cumulative budget) for each subawardee that is expected to perform work estimated to be more than $100,000 or 50 percent of the total work effort (whichever is less). Use the SF-424A (Excel version) Budget Information - Non Construction Programs, which can be found at https://www.eere-pmc.energy.gov/forms.aspx. Save each Subaward budget in a separate file. Use

up to 10 letters of the subawardee's name plus 424.pdf as the file name (e.g., name1.pdf). Click on "Add Optional Other Attachment" to attach.

A budget justification for the subaward budget is also required. The format provided as PMC 123.1 (Budget Justification for SF-424A) on the Applicant and Recipient Web Page at https://www.eere-pmc.energy.gov/forms.aspx is recommended but not required for use in providing this budget justification. Use up to 10 letters of the subawardee's name plus BJ.pdf as the file name (e.g., uclaBudJustif.pdf or energyresBudJustif.pdf), and click on "Add Optional Other Attachment" to attach.

h. Environmental Questionnaire (if required)

For Topic Area 2 ONLY, you must complete the environmental questionnaire at https://www.eere-pmc.energy.gov/NEPA.asp. As the online instructions indicate:

1. Enter your user ID and password to access the site (if you are a new user, select "Create a new account for me" and create a user ID and password). Then select "DOE PMC-EF1 Environmental Checklist" as your submission type and click "Login." *Please remember your User ID and Password for all future NEPA submissions. You may also return to view and update your previous submissions*.
2. On the next screen, complete all fields except for Subcontract Number (select "Eric Hass" as the DOE Project Officer in the dropdown box and specify "DE-PS36-08GO98008" as the Solicitation Number), and upload a document describing your project by clicking on the "Browse" button and selecting your file. Click "Create EF1 and Continue to Part I and Part II" to proceed.
3. Then, complete Part I of the Environmental Checklist and **make sure to click on the "Update Part I Information" button in the middle of the page.** After that, complete Part II and click on the "If You are Finished with Parts 1 & 2, Click to Continue to the Forms Area" button at the bottom of the page.
4. On the final screen, upload construction/operation/regulatory permits already obtained for the project and other relevant documents by clicking on the "Browse" button, selecting your file, and then clicking on the "Upload Now" button. Print the completed EF1, scan it to a PDF file and save the questionnaire in a single file named "Applicant_Name_EF1.pdf" and click on "Add Optional Other Attachment" to attach. When you have completed uploading all files, you may close the browser window as your EF1 submission is complete.

Please provide sufficient information to describe the extent of environmental benefits and impacts resulting from the proposed project including assumptions and quantitative data – provide as much information as possible on topics including, but not limited to, cultural and biological resources, handling/disposal of geothermal and power plant working fluids, road construction, transmission lines, and site restoration.

Sufficiently characterize the technical work to be accomplished and all historical and future environmental related activities in support of the proposed technical work. Include completed documents or links to completed documents and identify work remaining to be completed. These documents include, but are not limited to, permits, regulatory approvals, environmental assessments and environmental impact statements.

i. Project Management Plan

This plan should identify the activities/tasks to be performed, a time schedule for the accomplishment of the activities/tasks, the spending plan associated with the activities/tasks, and the expected dates for the release of outcomes. Applicants may use their own project management system to provide this information. This plan should identify any decision points and go/no-go decision criteria. Successful applicants must use this plan to report schedule and budget variances. Save this plan in a single file named "PMP.pdf" and click on "Add Optional Other Attachment" to attach.

j. SF-LLL Disclosure of Lobbying Activities (if applicable)

Complete form SF- LLL if any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the grant/cooperative agreement. The form is available in the optional document box on the grant application package page of grants.gov.

Summary of Required Forms/Files

Your application must include the following documents:

			Topic Area Application Requirements	
Name of Document	**Format**	**File Name**	**1 - Component Technologies R&D**	**2 - System Demonstrations**
SF 424 - Application for Federal Assistance	PDF	See Instructions	**X**	**X**
Other Attachments Form: Attach the following files to this form:	PDF	See Instructions	**X**	**X**
Project Summary/Abstract File	PDF	Summary.pdf	**X**	**X**
Project Narrative File, including required appendices (list appendices required with the Narrative, e.g. Letters of Commitment, Project Timetable, etc.)	PDF	Project.pdf	**X**	**X**
Resume File	PDF	Resume.pdf	**X**	**X**
SF 424A Excel - Budget Information for Non-Construction Programs File	Excel	SF424A.xls	**X**	**X**
Letters of Commitment	PDF		**X**	**X**
Budget Justification File (see instructions for format)	PDF	BudgetJustification.pdf	**X**	**X**
Subaward Budget File(s)	Excel	See Instructions	**if applicable**	**if applicable**
Environmental Questionnaire (EF1)	PDF	See Instructions		**X**
Project Management Plan	PDF	PMP.pdf	**X**	**X**
SF-LLL Disclosure of Lobbying Activities	PDF	SF-LLL.pdf	**if applicable**	**if applicable**

D. SUBMISSIONS FROM SUCCESSFUL APPLICANTS

If selected for award, DOE reserves the right to request additional or clarifying information for any reason deemed necessary, including, but not limited to:

- Indirect cost information
- Other budget information
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5)
- Representation of Limited Rights Data and Restricted Software, if applicable
- Commitment Letter from Third Parties Contributing to Cost Sharing, if applicable
- Environmental Questionnaire

E. SUBMISSION DATES AND TIMES

Pre-application Due Date

- Pre-applications are not required.

Application Due Date

- Applications must be received by August 12, 2008 11:59 PM Eastern Time. You are encouraged to transmit your application well before the deadline. The grants.gov Helpdesk is NOT available after 9:00 PM Eastern Time. **APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.**

F. INTERGOVERNMENTAL REVIEW

This program is not subject to Executive Order 12372 – Intergovernmental Review of Federal Programs.

G. FUNDING RESTRICTIONS

Cost Principles**.** Costs must be allowable in accordance with the applicable Federal cost principles referenced in 10 CFR Part 600. The cost principles for commercial organization are in FAR Part 31.

Pre-award Costs**.** Except for State/Local Governments and Indian tribes who must obtain the prior approval of the Contracting Officer, award recipients may charge to an award resulting from this announcement pre-award costs that were incurred within the ninety (90) calendar day period immediately preceding the effective date of the award, if the costs are allowable in accordance with the applicable Federal cost principles referenced in 10 CFR part 600. Recipients must obtain the prior approval of the contracting officer for any pre-award costs that are for periods greater than this 90 day calendar period.

Pre-award costs are incurred at the applicant's risk. DOE is under no obligation to reimburse such costs if for any reason the applicant does not receive an award or if the award is made for a lesser amount than the applicant expected.

H. SUBMISSION AND REGISTRATION REQUIREMENTS

Where to Submit

APPLICATIONS MUST BE SUBMITTED THROUGH GRANTS.GOV, AGAINST THIS ANNOUNCEMENT, TO BE CONSIDERED FOR AWARD. You cannot submit an application through Grants.gov unless you are registered. Please read the registration requirements below carefully and start the process immediately.

Submit electronic applications through the "Apply for Grants" function at www.Grants.gov. If you have problems completing the registration process or submitting your application, call Grants.gov at 1-800-518-4726 or send an email to support@grants.gov.

Registration Process Requirements

There are several one-time actions you must complete in order to submit an application through Grants.gov (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the Central Contract Registry (CCR), register with the credential provider, and register with Grants.gov). See http://www.grants.gov/applicants/get_registered.jsp. Use the Grants.gov Organization Registration Checklist at http://www.grants.gov/section3/OrganizationRegCheck.pdf to guide you through the process. IMPORTANT: During the CCR registration process, you will be asked to designate an E-Business Point of Contact (EBIZ POC). The EBIZ POC must obtain a special password called "Marketing Partner identification Number" (MPIN).
Applicants, who are not registered with CCR and Grants.gov, should allow at least 21 days to complete these requirements, as you must COMPLETE ALL STEPS of the one-time registration process before you can submit your first application through Grants.gov.

IMPORTANT NOTICE TO POTENTIAL APPLICANTS: When you have completed the process, you should call the Grants.gov Helpdesk at 1-800-518-4726 to verify that you have completed the final step (i.e. Grants.gov registration).

Microsoft Vista and Office 2007 Compatibility

Grants.gov is currently incompatible with both the new Microsoft (MS) Vista Operating System and the new Microsoft (MS) Office 2007 versions of Word, Excel, and Power Point. In order to create and submit your application to Grants.gov, you must find a computer with a previous version Microsoft Operating System, such as Windows XP.

If you attach a file created using MS Office 2007, you will not get an error message when you submit the application, HOWEVER, your entire application will not be able to be processed or accepted at Grants.gov and will not reach DOE. Grants.gov can accept applications with attachments created in MS Office 2007 if the attachments are saved in the prior format. See the http://www.grants.gov/assets/Vista_and_office_07_Compatibility.pdf for detailed instructions on how to do this. A file created in MS Office 2007 can be identified by the "x" at the end of the file extension, for example "sample.docx" for a Word file. Contact Grants.gov at 1-800-518-4726 with any questions.

Questions

ALL Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or support@grants.gov. Part VI, Section A. of this announcement explains how to submit other questions to the Department of Energy (DOE), relative to the content and requirements of this announcement.

Application Receipt Notices

After an application is submitted, the Authorized Organization Representative (AOR) will receive a series of five e-mails. It is extremely important that the AOR watch for and save each of the emails. It may take up to 2 business days from application submission to receipt of email Number 2. You will know that your application has reached DOE when the AOR receives email Number 5. You will need the Submission Receipt Number (email Number 1) to track a submission. The titles of the five e-mails are:

Number 1 - Grants.gov Submission Receipt Number
Number 2 - Grants.gov Submission Validation Receipt for Application Number
Number 3 - Grants.gov Grantor Agency Retrieval Receipt for Application Number
Number 4 - Grants.gov Agency Tracking Number Assignment for Application Number
Number 5 - DOE e-Center Grant Application Received

The last email will contain instructions for the AOR to register with the DOE e-Center. If the AOR is already registered with the DOE e-Center, the title of the last email changes to: Number 5 – DOE e-Center Grant Application Received and Matched

This email will contain the direct link to the application in IIPS. The AOR will need to enter their DOE e-Center user id and password to access the application.

Part VI - APPLICATION REVIEW INFORMATION

A. REVIEW CRITERIA

For both Topic Areas, prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that (1) the applicant is eligible for an award; (2) the information required by the announcement has been submitted; (3) all mandatory requirements are satisfied; and (4) the proposed project is responsive to the objectives of the funding opportunity announcement. If an application fails to meet these requirements, it may be deemed non-responsive and eliminated from full Merit Review.

For Topic Area 1 (Component Technologies R&D), **a**pplications will be evaluated against the merit review criteria shown below.

Criterion 1: Technical Merit and Innovation **Weight: [30%]**

- Applicability of the project to the strategic goals of the GTP
- Clearly states how the project supports the subtopic area target specifications
- Level of technical innovation and viability of the proposed technology over the current state of the art
- Credibility as supported by engineering calculations and existing quantitative data

Criterion 2: Project Research Plan **Weight: [30%]**

- Adequacy and clarity of statement of objectives, tasks, responsibilities and goals
- Likelihood of achieving project objectives through realistic milestones and logical task structure
- Adequacy and reasonableness of budget, spend plan, and schedule for the proposed project
- Adequacy and completeness of Gantt chart for the project

Criterion 3: Project Team, Equipment, and Facilities **Weight: [25%]**

- Capabilities of applicant and participants to comprehensively address all aspects of the proposed project
- Adequacy of equipment, laboratory and demonstration facilities, analytic support, and other necessary resources for performing the proposed project
- Appropriate involvement of private industry to ensure rapid introduction of technologies to the marketplace
- Level of participation by project participants as evidenced by letter(s) of commitment

Criterion 4: Technology Transfer **Weight: [15%]**

- Comprehensiveness of plan to disseminate results of research to others in the geothermal industry
- Level and variety of methods for dissemination, which may include conferences, papers, workshops, and web-based information sharing

- Timeliness and speed of technology transfer (i.e. publications, technical presentations, and patent filings)

The selection official may consider the following program policy factors in the selection process:

1. Technological diversity of projects
2. Cost share above the minimum
3. Relevance of projects to support GTP goals
4. Degree of student involvement from accredited academic institutions in projects

For Topic Area 2 (System Demonstrations), applications will be evaluated against the merit review criteria shown below.

Criterion 1: Project Description **Weight: [20%]**

- Adequacy and completeness of the statement of objectives
- Responsiveness of the proposal to critical research needs and demonstrated link to Topic Area objectives
- Level of technical quality, clarity, and completeness
- Technical merit and feasibility of the proposed work (i.e., is it based on sound scientific/engineering principles and on an understanding of current state of the art technology/methods in the geothermal industry)
- Amount that well stimulation and formation monitoring methods will advance technologies needed for EGS development

Criterion 2: Baseline of the Proposed Geologic Model(s) **Weight: [25%]**

- Adequacy of existing baseline data to create geothermal model
- Extent of the characterization, planning and permitting of the target well site
- Condition of target well (including amount of rework required)
- Demonstrated adequacy of infrastructure and transmission availability in existing power-producing fields to support the proposed project
- Demonstrated right of access to project site

Criterion 3: Stimulation and Data Collection/Analysis Approach **Weight: [35%]**

- Adequacy of target well to support the proposed project with minimum wellbore modification, construction, rework, or remediation
- Clarity and completeness of the description of each Objective necessary to complete the project and soundness of the discussion regarding implementation
- Soundness of the project management concept with respect to proposed tasks and organizational structure to achieve project/phase objectives
- Clarity and completeness of a plan to address potential risks and liabilities that are associated with the field stimulation project
- Likelihood of achieving project objectives through realistic milestones and logical task structure

- Adequacy, appropriateness, and reasonableness of the cost and schedule to complete the proposed project

Criterion 4: Project Team and Resources **Weight: [20%]**

- Demonstrated ability to assemble a multi-disciplined team with research experience and qualifications in the proposal subject area including experience of the PI and other investigators relevant to all aspects of the proposed project
- Level of participation by project participants as evidenced by letter(s) of commitment
- Demonstrated availability of equipment, laboratory and demonstration facilities, analytic support and other necessary resources for performing the proposed project and adequacy of resources to accommodate the proposed project
- Status of regulatory and environmental permitting required for the project

The selection official may consider the following program policy factors in the selection process:

1. Candidate sites with higher temperature gradients at shallow depths
2. Degree of student involvement from accredited academic institutions in projects
3. Availability to DOE of unrestricted data
4. Geologic diversity of projects
5. Geographic diversity of projects
6. Percentage of recipient cost share above the minimum required

B. REVIEW AND SELECTION PROCESS

a. Merit Review

Applications that pass the initial review will be subjected to a merit review in accordance with the guidance provided in the ”Department of Energy Merit Review Guide for Financial Assistance and Unsolicited Proposals.” This guide is at http://www.management.energy.gov/documents/meritrev.pdf.

It is very important that those documents, Project Abstract and Project Narrative file, that will be used during the Merit Review Process (uploaded to Fields 6 & 7) do not contain any Personally Identifiable Information as described in Appendix B.

b. Selection

The Selection Official may consider the merit review recommendation, program policy factors, and the amount of funds available.

c. Discussions and Award

The Government may enter into discussions with a selected applicant for any reason deemed necessary, including, but not limited to: (1) the budget is not appropriate or reasonable for the requirement; (2) only a portion of the application is selected for award; (3) the Government needs additional information to determine that the recipient is capable of complying with the requirements in 10 CFR part 600; and/or (4) special terms and conditions are required. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES

DOE anticipates notifying applicants selected for award and making awards by **the end of September 2008.**

Part VII - AWARD ADMINISTRATION INFORMATION

A. AWARD NOTICES

Notice of Selection

DOE will notify applicants selected for award. This notice of selection is not an authorization to begin performance. (See Part III.G with respect to the allowability of pre-award costs.)

Organizations whose applications have not been selected will be advised as promptly as possible. This notice will discuss the strengths and weaknesses of the application.

Notice of Award

A Notice of Financial Assistance Award issued by the contracting officer is the authorizing award document. It normally includes, either as an attachment or by reference: 1. Special Terms and Conditions; 2. Applicable program regulations, if any; 3. Application as approved by DOE; 4. DOE assistance regulations at 10 CFR part 600, or, for Federal Demonstration Partnership (FDP) institutions, the FDP terms and conditions; 5. National Policy Assurances To Be Incorporated As Award Terms; 6. Budget Summary; and 7. Federal Assistance Reporting Checklist, which identifies the reporting requirements.

B. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in 10 CFR part 600 (See: http://ecfr.gpoaccess.gov), except for grants made to Federal Demonstration Partnership (FDP) institutions. The FDP terms and conditions and DOE FDP agency specific terms and conditions are located on the National Science Foundation web site at http://www.nsf.gov/awards/managing/fed_dem_part.jsp.

Special Terms and Conditions and National Policy Requirements

The DOE Special Terms and Conditions for Use in Most Grants and Cooperative Agreements are located at http://management.energy.gov/business_doe/business_forms.htm under Award Terms. The National Policy Assurances To Be Incorporated As Award Terms are located at http://management.energy.gov/business_doe/business_forms.htm under Award Terms.

Intellectual Property Provisions

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at http://www.gc.doe.gov/financial_assistance_awards.htm.

Statement of Substantial Involvement

The DOE Geothermal Technologies Program will be substantially involved in agreements made under this FOA. DOE will provide expertise in the following areas: exploration techniques and tools, downhole reservoir characterization tools, stress field analysis, rock mechanics, structural modeling, seismic monitoring and interpretation, and geothermal reservoir characterization and management.

C. REPORTING

In addition to any specific reporting requirements as specified in Topic Area Descriptions in Part II, reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement. The proposed Checklist for this program is https://www.eere-pmc.energy.gov/procurenet/FinancialAssistance/Forms/DOE_Forms/DOEF4600_2.doc

PART VIII - QUESTIONS/AGENCY CONTACTS

A. QUESTIONS

Questions regarding the content of the announcement must be submitted through the "Submit Question" feature of the DOE Industry Interactive Procurement System (IIPS) at http://e-center.doe.gov. Locate the program announcement on IIPS and then click on the "Submit Question" button. Enter required information. You will receive an electronic notification that your question has been answered. DOE will try to respond to a question within 3 business days, unless a similar question and answer have already been posted on the website. Potential applicants are encouraged to read all posted Q&A prior to posting a new question.

Questions relating to the registration process, system requirements, how an application form works, or the submittal process are not answered via the DOE IIPS "submit question" feature, and must be directed to Grants.gov at 1-800-518-4726 or support@grants.gov. DOE cannot answer these questions. (See Part III, Section H.)

B. AGENCY CONTACT(S)

Name: Pete Simon
E-mail: go.geothermal@go.doe.gov

All questions should be submitted through the "Submit Question" feature of IIPS. (See Part A of this Part, above.)

PART IX - OTHER INFORMATION

A. MODIFICATIONS

Notices of any modifications to this announcement will be posted on Grants.gov and the DOE Industry Interactive Procurement System (IIPS). You can receive an email when a modification or an announcement message is posted by joining the mailing list for this announcement through the link in IIPS. When you download the application at Grants.gov, you can also register to receive notifications of changes through Grants.gov.

B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE

DOE reserves the right, without qualification, to reject any or all applications received in response to this announcement and to select any application, in whole or in part, as a basis for negotiation and/or award.

C. COMMITMENT OF PUBLIC FUNDS

The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by other than the Contracting Officer, either explicit or implied, is invalid.

D. PROPRIETARY APPLICATION INFORMATION

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, disclosure of which may harm the applicant, should be included in an application only when such information is necessary to convey an understanding of the proposed project. The use and disclosure of such data may be restricted, provided the applicant includes the following legend on the first page of the project narrative and specifies the pages of the application which are to be restricted:

"The data contained in pages _____ of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government's right to use or disclose data obtained without restriction from any source, including the applicant."

To protect such data, each line or paragraph on the pages containing such data must be specifically identified and marked with a legend similar to the following:

"The following contains proprietary information that (name of applicant) requests not be released to persons outside the Government, except for purposes of review and evaluation."

E. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL

In conducting the merit review evaluation, the Government may seek the advice of qualified non-Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

F. INTELLECTUAL PROPERTY DEVELOPED UNDER THIS PROGRAM

Patent Rights. The government will have certain statutory rights in an invention that is conceived or first actually reduced to practice under a DOE award. 42 U.S.C. 5908 provides that title to such inventions vests in the United States, except where 35 U.S.C. 202 provides otherwise for nonprofit organizations or small business firms. However, the Secretary of Energy may waive all or any part of the rights of the United States subject to certain conditions. (See "Notice of Right to Request Patent Waiver" in paragraph G below.)

Rights in Technical Data. Normally, the government has unlimited rights in technical data created under a DOE agreement. Delivery or third party licensing of proprietary software or data developed solely at private expense will not normally be required except as specifically negotiated in a particular agreement to satisfy DOE's own needs or to insure the commercialization of technology developed under a DOE agreement.

For reference, the standard IP clauses for grants and cooperative agreements may be found at http://www.gc.doe.gov/financial_assistance_awards.htm. FFRDCs are governed by their Government contracts for IP purposes. In general, IP terms are non-negotiable and must be accepted to receive the award.

All questions regarding Intellectual Property must be submitted through the "Submit Question" feature of the DOE Industry Interactive Procurement System (IIPS) at http://e-center.doe.gov as described in Part VI, Section A of this announcement.

G. NOTICE OF RIGHT TO REQUEST PATENT WAIVER

Applicants may request a waiver of all or any part of the rights of the United States in inventions conceived or first actually reduced to practice in performance of an agreement as a result of this announcement, in advance of or within 30 days after the effective date of the award. Even if such advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver of the rights of the United States in identified inventions, i.e., individual inventions conceived or first actually reduced to practice in performance of the award. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.

Domestic small businesses and domestic nonprofit organizations will receive the patent rights clause at 37 CFR 401.14, i.e., the implementation of the Bayh-Dole Act. This clause permits domestic small business and domestic nonprofit organizations to retain title to subject inventions. Therefore, small businesses and nonprofit organizations do not need to request a waiver.

H. NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES

Eligible activities under this program include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

I. NOTICE OF RIGHT TO CONDUCT A REVIEW OF FINANCIAL CAPABILITY

DOE reserves the right to conduct an independent third party review of financial capability for applicants that are selected for negotiation of award (including personal credit information of principal(s) of a small business if there is insufficient information to determine financial capability of the organization).

J. NOTICE OF POTENTIAL DISCLOSURE UNDER FREEDOM OF INFORMATION ACT

Applicants should be advised that identifying information regarding all applicants, including applicant names and/or points of contact, may be subject to public disclosure under the Freedom of Information Act, whether or not such applicants are selected for negotiation of award.

REFERENCE MATERIAL

Appendix A – Definitions

"Amendment" means a revision to a Funding Opportunity Announcement

"**Applicant**" means the legal entity or individual signing the Application. This entity or individual may be one organization or a single entity representing a group of organizations (such as a Consortium) that has chosen to submit a single Application in response to a Funding Opportunity Announcement.

"**Application**" means the documentation submitted in response to a Funding Opportunity Announcement. NOTE: Application is referred to as Proposal in IIPS.

"Authorized Organization Representative (AOR)" is the person with assigned privileges who is authorized to submit grant applications through Grants.gov on behalf of an organization. The privileges are assigned by the organization's E-Business Point of Contact designated in the CCR.

"**Award**" means the written documentation executed by a DOE Contracting Officer, after an Applicant is selected, which contains the negotiated terms and conditions for providing Financial Assistance to the Applicant. A Financial Assistance Award may be either a Grant or a Cooperative Agreement.

"**Budget**" means the cost expenditure plan submitted in the Application, including both the DOE contribution and the Applicant Cost Share.

"**Consortium (plural consortia)**" means the group of organizations or individuals that have chosen to submit a single Application in response to a Funding Opportunity Announcement.

"**Contracting Officer**" means the DOE official authorized to execute Awards on behalf of DOE and who is responsible for the business management and non-program aspects of the Financial Assistance process.

"**Cooperative Agreement**" means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and Substantial Involvement (see definition below) is anticipated between DOE and the Applicant during the performance of the contemplated activity.

"**Cost Sharing**" means the respective share of Total Project Costs to be contributed by the Applicant and by DOE. The percentage of Applicant Cost Share is to be applied to the Total Project Cost (i.e., the sum of Applicant plus DOE Cost Shares) rather than to the DOE contribution alone.

"Central Contractor Registry (CCR)" is the primary database which collects, validates, stores and disseminates data in support of agency missions. Funding Opportunity Announcements which require application submission through Grants.gov require that the organization first be registered in the CCR at http://www.grants.gov/CCRRegister.

"Credential Provider" is an organization that validates the electronic identity of an individual through electronic credentials, PINS, and passwords for Grants.gov. Funding Opportunity Announcements which require application submission through Grants.gov require that the individual applying on behalf of an organization first be registered with the Credential Provider at https://apply.grants.gov/OrcRegister.

"Data Universal Numbering System (DUNS) Number" is a unique nine-character identification number issued by Dun and Bradstreet (D&B). Organizations must have a DUNS number prior to registering in the CCR. Call 1-866-705-5711 to receive one free of charge. http://www.grants.gov/applicants/request_duns_number.jsp

"E-Business Point of Contact (POC)" is the individual who is designated as the Electronic Business Point of Contact in the CCR registration. This person is the sole authority of the organization with the capability of designating or revoking an individual's ability to submit grant applications on behalf of their organization through Grants.gov.

"E-Find" is a Grants.gov webpage where you can search for Federal Funding Opportunities in FedGrants. http://www.grants.gov/search/searchHome.do

"Enhanced Geothermal Systems (EGS)" is defined as cost-effective methods of transforming geothermal resources that lack adequate water and/or rock permeability into functional hydrothermal reservoirs.

"**Financial Assistance**" means the transfer of money or property to an Applicant or Participant to accomplish a public purpose of support authorized by Federal statute through Grants or Cooperative Agreements and sub-awards. For DOE, it does not include direct loans, loan guarantees, price guarantees, purchase agreements, Cooperative Research and Development Agreements (CRADAs), or any other type of financial incentive instrument.

"Federally Funded Research and Development Center (FFRDC)" means a research laboratory as defined by Federal Acquisition Regulation 35.017.

"Funding Opportunity Announcement (FOA)" is a publicly available document by which a Federal agency makes known its intentions to award discretionary grants or cooperative agreements, usually as a result of competition for funds. Funding opportunity announcements may be known as program announcements, notices of funding availability, solicitations, or other names depending on the agency and type of program.

"Geothermal" refers to the stored thermal energy in, or heat produced from, the Earth's interior.

"Geothermal Resources" are defined as geothermal conditions where the technology exists to use the stored thermal energy to either produce electricity or for direct use, e.g., space heating, district heating, snow melting, aquaculture, etc.

"**Grant**" means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and no Substantial Involvement is

anticipated between DOE and the Applicant during the performance of the contemplated activity.

"Grants.gov" is the "storefront" web portal which allows organizations to electronically find and apply for competitive grant opportunities from all Federal grant-making agencies. Grants.gov is THE single access point for over 900 grant programs offered by the 26 Federal grant-making agencies. http://www.grants.gov

"Hydrothermal Resources" are defined as those geothermal resources that contain sufficient heat, fluid and permeability to be commercially productive using existing drilling, reservoir engineering and power conversion technologies; are currently being produced.

"Industry Interactive Procurement System (IIPS)" is DOE's Internet-based procurement system which allows access to DOE's business opportunities database, allows user registration and submittal of Applications: http://e-center.doe.gov/.

"**Key Personnel**" means the individuals who will have significant roles in planning and implementing the proposed Project on the part of the Applicant and Participants, including FFRDCs.

"Marketing Partner Identification Number (MPIN)" is a very important password designated by your organization when registering in CCR. The E-Business Point of Contact will need the MPIN to login to Grants.gov to assign privileges to the individual(s) authorized to submit applications on behalf of your organization. The MPIN must have 9 digits containing at least one alpha character (must be in capital letters) and one number (no spaces or special characters permitted).

"Mini-frac" refers to a small-scale fracturing operation performed prior to well stimulation in order to acquire key design data about the target rock matrix.

"Packer" refers to a device that can be placed in the wellbore to block vertical fluid flow so as to isolate zones.

"**Participant**" for purposes of this Funding Opportunity Announcement only, means any entity, except the Applicant substantially involved in a Consortium, or other business arrangement (including all parties to the Application at any tier), responding to the Funding Opportunity Announcement.

"**Project**" means the set of activities described in an Application, State plan, or other document that is approved by DOE for Financial Assistance (whether such Financial Assistance represents all or only a portion of the support necessary to carry out those activities).

"Proposal" is the term used in IIPS meaning the documentation submitted in response to a Funding Opportunity Announcement. Also see Application.

"Recipient" means the organization, individual, or other entity that receives a Financial Assistance Award from DOE, is financially accountable for the use of any DOE funds or

property provided for the performance of the Project, and is legally responsible for carrying out the terms and condition of the award.

"**Selection**" means the determination by the DOE Selection Official that negotiations take place for certain Projects with the intent of awarding a Financial Assistance instrument.

"Selection Official" means the DOE official designated to select Applications for negotiation toward Award under a subject Funding Opportunity Announcement.

"**Substantial Involvement**" means involvement on the part of the Government. DOE's involvement may include shared responsibility for the performance of the Project; providing technical assistance or guidance which the Applicant is to follow; and the right to intervene in the conduct or performance of the Project. Such involvement will be negotiated with each Applicant prior to signing any agreement.

"**Total Project Cost**" means all the funds to complete the effort proposed by the Applicant, including DOE funds (including direct funding of any FFRDC) plus all other funds that will be committed by the Applicant as Cost Sharing.

“Workover” refers to the performance of remedial operations on a well in order to prepare it for stimulation activities.

Appendix B – Personally Identifiable Information

In responding to this Announcement, Applicants must ensure that Protected Personally Identifiable Information (PII) is not included in the following documents: Project Abstract, Project Narrative, Biographical Sketches, Budget or Budget Justification. These documents will be used by the Merit Review Committee in the review process to evaluate each application. PII is defined by the Office of Management and Budget (OMB) and DOE as:

> Any information about an individual maintained by an agency, including but not limited to, education, financial transactions, medical history, and criminal or employment history and information that can be used to distinguish or trace an individual's identity, such as their name, social security number, date and place of birth, mother's maiden name, biometric records, etc., including any other personal information that is linked or linkable to an individual.

This definition of PII can be further defined as: (1) Public PII and (2) Protected PII.

1. **Public PII:** PII found in public sources such as telephone books, public websites, business cards, university listing, etc. Public PII includes first and last name, address, work telephone number, email address, home telephone number, and general education credentials.

2. **Protected PII:** PII that requires enhanced protection. This information includes data that if compromised could cause harm to an individual such as identity theft.

Listed below are examples of Protected PII that Applicants must not include in the files listed above to be evaluated by the Merit Review Committee.

- Social Security Numbers in any form
- Place of Birth associated with an individual
- Date of Birth associated with an individual
- Mother's maiden name associated with an individual
- Biometric record associated with an individual
- Fingerprint
- Iris scan
- DNA
- Medical history information associated with an individual
- Medical conditions, including history of disease
- Metric information, e.g. weight, height, blood pressure
- Criminal history associated with an individual
- Employment history and other employment information associated with an individual
- Ratings
- Disciplinary actions
- Performance elements and standards (or work expectations) are PII when they are so intertwined with performance appraisals that their disclosure would reveal an individual's performance appraisal
- Financial information associated with an individual

- Credit card numbers
- Bank account numbers
- Security clearance history or related information (not including actual clearances held)

Appendix C – Cost Share Information

The requirement for cost sharing included in Funding Opportunity Announcements (FOA) issued competitively by the Department of Energy (DOE) is either statutory, programmatic, or both. Certain federal statutes require a minimum cost share requirement, by either type of activities funded or by Program. This is known as statutory cost share. The Program may also, at its discretion, require a greater level of cost share than the statutory minimum, or require cost share when there is no minimum requirement, as it determines appropriate. This is called programmatic cost share.

Research and development (R&D) activities (other than R&D activities related to basic science) require Recipients (those receiving the financial assistance awards from DOE) to cost share at a minimum of 20% of total project costs. Demonstration and Deployment activities require Recipients to cost share at a minimum of 50% of total project costs. These statutory requirements are prescribed in Section 988 of the Environmental Policy Act (EPAct) of 2005. Any waiver of this requirement must be approved by the Secretary of Energy.

When responding to a DOE FOA, an Applicant will have the opportunity to ask questions at the DOE IIPS website (https://e-center.doe.gov/). Specific questions as to the acceptability and allowability of intended cost share for a proposed project in response to a FOA may be posed at this site during the time period when the FOA is open for questions.

The regulations that govern Federal Financial Assistance for DOE are found at 10 Code of Federal Regulations (CFR) Part 600. Specifically, Section 600.313, "Cost sharing and matching" provides guidance on acceptable contributions toward cost share requirements, as well as guidance on the valuation and documentation of contributions, for "for profit" organizations. Below is a summary of these requirements as contained in the CFR. The full CFR section may be viewed using the following link: (http://www.access.gpo.gov/nara/cfr/cfr-table-search.html).

Acceptable contributions, including cash contributions and third party contributions, must be accepted as part of the recipient's cost sharing or matching if such contributions meet all of the following criteria:

- They are verifiable from the recipient's records.
- They are not included as contributions for any other federally-assisted project or program.
- They are necessary and reasonable for proper and efficient accomplishment of project or program objectives.
- They are allowable under 10 CFR 600.317.
- They are not paid by the Federal Government under another award unless authorized by Federal statute to be used for cost sharing or matching.
- They are provided for in the approved budget.
- They conform to other provisions of this part, as applicable.

General examples of allowable cost share are shown below. It is up to the applicant to

ensure that the cost share proposed in response to this FOA is allowable under 10 CFR 600.313.

- Cash provided directly by the recipient, or a sub-recipient;
- State or local government funds provided to support the proposed project, which were not provided to the State by the federal Government;
- Employees' salaries included in the budget, if paid by the employer (recipient or sub-recipient), and not reimbursed by the federal funding of the project;
- Rental value of buildings or equipment necessary to the success of the proposed project and the value of which is included in the budget for the project;
- Monetary value of SOPO activities to be performed by a third party which are included in the project budget and will not be reimbursed by federal funds.